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# UNITED STATES PATENT AND TRADEMARK OFFICE

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/977,304 | 10/16/2001 | Andreas Eisele | 110877 | 4671 |

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| EXAMINER |
|---|
| SKED, MATTHEW J |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2655 | |

DATE MAILED: 07/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

| | Application No. | Applicant(s) |
|---|---|---|
| **Office Action Summary** | 09/977,304 | EISELE, ANDREAS |
| | Examiner | Art Unit | |
| | Matthew J. Sked | 2655 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

### Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**.    2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
  closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

4)☒ Claim(s) _1-26_ is/are pending in the application.

  4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-26_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

### Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _16 October 2001_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

  Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

  Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

  a)☐ All   b)☐ Some *  c)☐ None of:

    1.☐ Certified copies of the priority documents have been received.

    2.☐ Certified copies of the priority documents have been received in Application No. _____.

    3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
      application from the International Bureau (PCT Rule 17.2(a)).

  * See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
   Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

1.       The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2.       Claim 24 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement.  The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 24 recites the limitation "the potentially missing search strings".  There is no explanation of this term in the specification as to give one of ordinary skill in the art to understand this limitation.  The only explanation of claim 24 is found on page 11, lines 20-23, "However, if matching of partial tuples is needed and non-initial components are missing from the search tuple, the order of the components needs to be arranged such that the potentially missing components appear first".  This does not specifically describe what the "missing potentially missing components" are and how the system would know that these missing components exist.  Also it is unclear what advantages to searching would be found by rearranging the strings so that these "potentially missing components" appear first in the query.

3.       The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4.      Claims 9, 11 and 24 are rejected under 35 U.S.C. 112, second paragraph, as

being indefinite for failing to particularly point out and distinctly claim the subject matter

which applicant regards as the invention.

Claims 9 and 11, state "storing the memory positions assigned to the first

character strings" and "storing the memory positions assigned to the second character

strings" (emphasis added).  However, claim 1 states that there is only one first character

string and one character string each with one memory position.  For the purposes of

Examination it will be assumed these claims to recite "using the numeric identifiers to

query the positional arrays for assigning memory positions to the character strings".

Claim 24 recites the limitation "the potentially missing search strings".  There is

no reference previously to any potentially missing search strings.  Also, it is unclear

what is meant by this limitation, specifically are these potentially missing search strings

the strings in the source text that are not found in the search key or if these potentially

missing search strings refer to strings that may be pointed to by the strings in the search

key.

## Claim Rejections - 35 USC § 102

5.      The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by
another filed in the United States before the invention by the applicant for patent or (2) a patent
granted on an application for patent by another filed in the United States before the invention by the
applicant for patent, except that an international application filed under the treaty defined in section
351(a) shall have the effects for purposes of this subsection of an application filed in the United States

only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6.      Claims 1, 3, 4, 6, 14, 16, 17, 19, 25 and 26 are rejected under 35 U.S.C. 102(e) as being anticipated by Morimoto et al. (U.S. Pat. 6,789,057).

As per claims 1 and 25, Morimoto teaches a method and system for encoding linguistic frequency data, the method comprising:

identifying a plurality of sets of character strings in a source text, each set comprising at least a first and a second character string (the dictionary entry which is found from the text and the word before it are stored as bigrams, col. 11, lines 46-48);

for each set, obtaining frequency data indicative of the frequency of the respective set in the source text (bigram table stores all the bigrams with frequencies, col. 11, lines 49-50);

for each character string that is a first character string in at least one of the sets, assigning a memory position in a first memory array to the respective character string and storing at said memory position the frequency data of each set comprising the respective character string as first character string (second word of bigram stores with it the frequency of the bigram, col. 11, lines 46-60 and Fig. 13); and

for each character string that is a second character string in at least one of the sets, assigning a memory position in a second memory array to the respective character string and storing at said memory position, for each set comprising the respective character string as second character string, a pointer pointing to a memory position in the first memory array assigned to the corresponding first character string of the respective set and having stored the frequency data of the respective set (first word of

the bigram contains a pointer pointing to the array containing the second word and the frequency data, col. 11, lines 46-60 and Fig. 13).

7.     As per claims 14 and 26, Morimoto teaches a method and system for accessing encoded linguistic frequency data for retrieving the frequency of a search key in a text, the search key comprising a first and a second search string, the encoded data being stored in a first memory array storing frequency data and a second memory array storing pointers to the first memory array, the frequency data being indicative of the frequencies of character sets in a source text, the character sets each including at least two character strings, the method comprising:

identifying a region in the first memory array that is assigned to the first search string (user enters an input sequence and candidate words are identified, col. 13, line 56 to col. 14, line 3),

identifying a region in the second memory array that is assigned to the second search string (user enters an input sequence and candidate words are identified, col. 13, line 56 to col. 14, line 3),

identifying a pointer stored in the region of the second memory array, pointing to a memory position within the region of the first memory array (searches the pointer to determine the next word in the bigram, col. 11, lines 58-60), and

reading the frequency data stored at said memory position (obtains the frequency data, col. 11, lines 58-60).

8.     As per claims 3 and 16, Morimoto teaches the character string is a word of a natural language (Fig. 13).

9.      As per claims 4 and 17, Morimoto teaches the set of character strings comprise n

character strings, n being an integer number greater than one, each set being an n-

gram (the character strings are bigrams hence n is two, col. 11, lines 46-60).

10.     As per claims 6 and 19, Morimoto teaches the frequency data includes the

number of occurrences of the respective set in the source text (frequency of the word

string that follows the ith word, col. 11, lines 46-60).


## Claim Rejections - 35 USC § 103

11.     The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

12.     Claims 2, 5, 7-11, 15, 18, 20 and 18 rejected under 35 U.S.C. 103(a) as being

unpatentable over Morimoto in view of Hargrave (U.S. Pat. 5,724,593).

        As per claims 2, 5, 15 and 18, Morimoto does not teach a third character string

hence giving trigrams.

        Hargrave teaches a translation machine that performs a count of trigrams in a

document (trigram frequencies are tabulated, col. 6 lines 53-54 and col. 7, lines 7-13).

Given the teachings of Morimoto it would suggest that the addition of a third character

string would contain a pointer referencing the second string.  Because Morimoto

teaches using a pointer from the second character string to point to the first character

string, a pointer would need to be used by the third character string to reference the second character string in order to stay consistent.

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the system of Morimoto to use a third character string because, as taught by Hargrave, it would be preferable to use with English and Indo-European languages (col. 6, lines 33-37).

13.     As per claims 7 and 20, Morimoto does not teach the frequency data indicative of the frequency of the respective set in the source text includes weight numbers of a maximum entropy model.

Hargrave teaches calculating and storing the entropy weights of each n-gram (col. 7, lines 56 to col. 8, line 27).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the system of Morimoto to store weight numbers of a maximum entropy model because, as taught by Hargrave, weighting allows less meaningful n-grams to be distinguished from more meaningful n-grams (col. 5, lines 55-56).

14.     As per claim 8, Morimoto does not teach mapping each character string occurring in the source text to a numeric identifier identifying the character string, by operating a finite-state machine.

Hargrave teaches converting the trigrams to Unicode, which would inherently be performed using a finite state machine (col. 6, line 54 to col. 7, line 6).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the system of Morimoto to map each character string to a numeric

identifier by a finite state machine because, as taught by Hargrave, it would allow processing modules to act independently from the language being processed (col. 6, lines 64-67).

15.     As per claim 10, Morimoto does not teach assigning a numeric identifier to each character string occurring in the source text.

Hargrave teaches assigning an ID number to each n-gram (col. 9, lines 36-48).

Neither Morimoto nor Hargrave teach using a Hash Table to assign this number but it is notoriously well known in the art to use Hash tables as displayed by Hargrave (uses a Hash Table to represent n-grams with their associated frequencies and weights, col. 12, line 56 to col. 13, line 3).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the system of Morimoto to assign an ID number to each n-gram, as taught by Hargrave, by using a Hash Table because this would allow easy reference to the n-grams (col. 9, lines 45-48).

16.     As per claims 9 and 11, Morimoto does not teach using the numeric identifiers to query the positional arrays for assigning memory positions to the character strings.

Hargrave teaches using the ID number to reference the n-grams hence assigning the n-grams to current memory (col. 9, lines 41-47).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the system of Morimoto to use numeric identifiers to query positional arrays because, as taught by Hargrave, this would allow easier reference to the n-grams (col. 9, lines 44-47).

17.     Claims 12, 13 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Morimoto.

As per claim 12, Morimoto does not teach sorting the pointers in the second

memory array relating to the same second character string, with respect to the memory

positions of the first memory array to which the pointers point.

However, the Examiner takes Official Notice that sorting character strings is

notoriously well known in the art.   Therefore, it would have been obvious to one of

ordinary skill in the art at the time of invention to modify the system of Morimoto to sort

the pointers in the memory array relating to the same second character string because it

would allow for easier reference hence facilitating use.

18.     As per claim 13, Morimoto does not specifically teach storing the pointers in

compressed form.

However, the Examiner takes Official Notice that compressing data is notoriously

well known in the art.   Therefore, it would have been obvious to one of ordinary skill in

the art at the time of invention to modify the system of Morimoto to compress the

pointers because this would save memory.

19.     As per claim 21, Morimoto does not teach performing a binary searching within

the second memory array.

However, the Examiner takes Official Notice that binary searches are notoriously

well known in the art.   Therefore, it would have been obvious to one of ordinary skill in

the art at the time of invention to modify the system of Morimoto to perform a binary

search in the second memory array because this would be faster than searching in
every memory location.

20.     As per claim 22, Morimoto does not teach identifying a sub-interval in the region
of the second memory array, the sub-interval including at least two pointers pointing to a
memory position within the region of the first memory array.

However, the Examiner takes Official Notice that using multiple pointers to
reference the same data is well known in the art.  Therefore, it would have been obvious
to one of ordinary skill in the art at the time of invention to modify the system of
Morimoto to use multiple pointers to point to a memory position because this would
allow for faster location of the pointers within the second memory array.

21.     As per claim 23, Morimoto does not specifically teach performing a binary search
for a set of pairs of strings where the first string in each pair matches the first search
string, performing a second binary search for a set of pairs of strings where the second
string in each pair matches the second search string, and calculating an intersection of
both sets.

However, the Examiner takes Official Notice that performing searches with the
AND operator is notoriously known in the art.  Therefore, it would have been obvious to
one of ordinary skill in the art at the time of invention to perform two binary searches for
each string and finding the intersection of the results because it would allow the system
to search for both strings hence improving searching.

## *Conclusion*

22.    The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Smadja (U.S. Pat. 6,173,298), Lau et al. (U.S. Pat. 5,640,487) and Gilai et al. (U.S. Pat. 6,256,630) teach methods of counting n-gram frequencies.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J. Sked whose telephone number is (571) 272-7627. The examiner can normally be reached on Mon-Fri (8:00 am - 4:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wayne Young can be reached on 571-272-7582. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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07/06/05

SUSAN MCFADDEN
PRIMARY EXAMINER